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審査請求 未請求

(全 1 頁)

⑭ エアクリーナ

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⑱ 考 案 者 石井毅夫

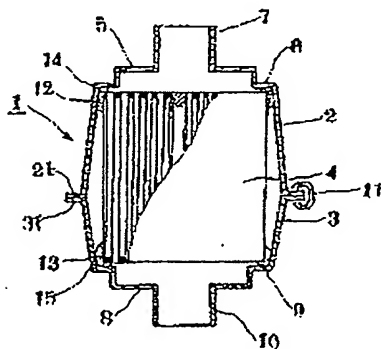
⑲ 実用新案登録請求の範囲

伊材で仕切られた多数の互に平行な貫通路の入口部と出口部を交互に閉塞し、外周壁両端に突出部を有するパツキンを図着したハニカム体を、一方端が開口し、他方端が出口管を有する閉塞板で閉塞して成るケーシングと、一方端が開口し他方端が入口管を有する閉塞板で閉塞して成るカバーとで形成したハウジング内に配置し、ケーシングとカバーとの開口をハニカム体側壁中央近傍で結合させたエアクリーナ。

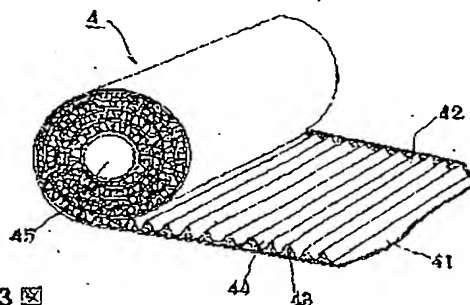
図面の簡単な説明

第1図は本考案のエアクリーナの断面図、第2図は一実施例であるスパイラル型エレメント、第3図は段部とウレタンパツキンの状態図である。
1……エアクリーナ、2……ケーシング、3……カバー、4……ハニカム体、5、9……段部、12、13……パツキン。

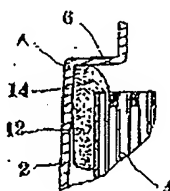
第1図



第2図



第3図



JAPANESE PATENT OFFICE
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KOKAI UTILITY MODEL NO. SHO 59[1984]-170669

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AIR CLEANER

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[There are no amendments to this utility model.]

Claim

A type of air cleaner characterized by the following facts: a honeycomb filter element, in which the inlets and outlets of plural through passages partitioned by filtering material and parallel to each other are closed off alternately, and which has protrusions on both ends of the outer peripheral wall, is set in a housing composed of a casing, which has one end open and the other end closed by means of a closing plate with an outlet pipe, and a cover, which has one end open and the other end equipped with an inlet pipe; the openings of the casing and the cover are connected near the center of the side wall of the honeycomb filter element.

Brief description of the figures

Figure 1 is a cross section of the air cleaner of this device. Figure 2 is a diagram illustrating the spiral element in an application example of this device. Figure 3 is a diagram illustrating the step part and the polyurethane packing.

- | | |
|--------|--------------------------|
| 1 | Air cleaner |
| 2 | Casing |
| 3 | Cover |
| 4 | Honeycomb filter element |
| 6, 9 | Step part |
| 12, 13 | Packing |

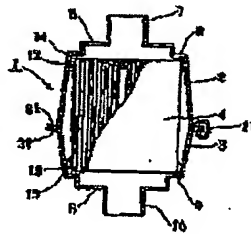


Figure 1

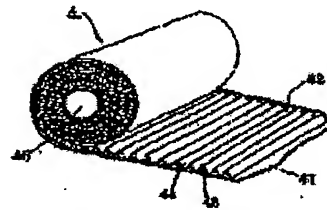


Figure 2

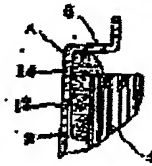


Figure 3

Detailed explanation of the device

This device pertains to a type of air cleaner for use in internal combustion engines.

Recently, with rising fuel prices, efforts have been made to reduce the weight of the parts of internal combustion engines. Efforts have also been made to reduce the weight of air cleaners

by deleting structural members or using resins to make them. On the other hand, from the standpoint of maintenance-free operation, there has been demand for extension of the service life of the air cleaner elements. In order to satisfy this demand, Japanese Kokai Utility Model No. Sho 56[1981]-118951 has proposed a type of air cleaner characterized by the fact that the element is fixed on one of two end covers of a cylindrical casing so that the end plate is omitted on this side, while the other end cover has an air inlet. Also, Japanese Kokai Patent Application No. Sho 57[1982]-140554 has proposed a type of air cleaner characterized by the fact that the upper and lower end plates are omitted, and the filtering member is formed with a bag shape. These schemes have some problems, however; in the former scheme, because of the conventional chrysanthemum-shaped element, it is impossible to extend the service life without changing the filtering area. In the latter scheme, because the longitudinal cross section of the element has a continuous V shape the number of the pleats that can be accommodated in the radial direction on the surface on one side is limited, and there is no way to increase the filtering area. Also, because a cap is needed for the structure, no structural members can be deleted, and there is no way to reduce the weight.

The purpose of this device is to solve the aforementioned problems by providing a type of air cleaner characterized by the fact that, in a housing composed of a cylindrical casing and a cylindrical cover, a honeycomb filter element is set that has the inlets and outlets of plural through passages that are partitioned with a filtering material alternately closed off, and attachment together of said casing and cover is performed at the central portion of the side wall of the honeycomb filter element. Consequently, it is possible to reduce the number of the structural members and to reduce weight, and at the same time it is possible to increase the filtering area and to extend the service life. In addition, replacement of the honeycomb filter element is easier. In the following, this device will be explained with reference to application examples.

As shown in Figure 1, air cleaner (1) is prepared by setting a honeycomb filter element, such as spiral element (4), in a housing composed of tapered cylindrical casing (2) and cylindrical cover (3) also tapered. Cylindrical casing (2) has one end open, with flange (21) on its outer periphery. The other end is closed by closing plate (5) having outlet pipe (7) at its center and having step part (6) on the outer peripheral edge. It has a so-called tapered shape, with the diameter being reduced as the position is moved from the opening at one end to closing plate (5) at the other end. The distance between flange (21) and closing plate (5) is equal to half the length of element (4). Cylindrical cover (3) has one end open, with flange (31) having the same diameter as that of said casing flange (21) on its outer periphery, and on the other end it has step part (9) on the outer peripheral edge and is closed off by closing plate (8) having inlet pipe (10) formed in it. Just as with casing (2), a tapered shape is formed as the position is moved towards

closing plate (8). Casing flange (21) and cover flange (31) are fixed with clips (11), bolts, or other fixing means to form a housing. Spiral element (4) is arranged inside the housing. Also, the housing (2) and cover (3) do not need to be tapered. They can form a right-circular cylinder. Also, one may arrange metal mesh or a perforated steel plate in inlet pipe (10) of cover (3).

As shown in Figure 2, spiral element (4) is prepared by laminating together flat filtering sheet (41) and corrugated filtering sheet (42) having crest portions (43) and trough portions (44), and by closing off crest portions (43) on one end and trough portions (44) on the other end, followed by winding the filtering materials around the periphery of core cylinder (45). Also, the spiral element (4) may be prepared as follows: a flat filtering sheet is formed in a U shape, and is wound spirally on the periphery of the core cylinder, followed by closing off alternately. As shown in Figure 3, polyurethane packings (12), (13), which have an outer diameter a little smaller than the inner diameter of casing (2) and have protrusions (14), (15) that protrude beyond the end surfaces of element (4) and engaged with the end edge surfaces, are fixed at the upper and lower ends of the outer peripheral wall of element (4), and said protrusions (14), (15) slope gradually toward outer peripheral apex A.

For air cleaner (1) with the aforementioned constitution, when the internal combustion engine is started, dust-containing air flows in through opening (33) of cover (3), as it flows through the filtering material of element (4) it is cleaned, and the cleaned air flows through outlet pipe (6) into the internal combustion engine (not shown in the figure). In this case, protrusions (14), (15) of polyurethane packings (12), (13) set on the upper and lower ends of element (4), respectively, are pressed by end portions (14), (15) [sic] of the outer peripheral edges of casing (2) and cover (3), so that they do not move up/down due to vibration of the internal combustion engine. They are buffered by the outer peripheral portions of packings (12), (13) in contact with casing (2) and cover (3), and force is no applied on the inner peripheral portions of packings (12), (13) fixed on element (4), so that separation from the element (4) can be prevented, with sealing guaranteed. With respect to force in the left/right direction due to vibration of the internal combustion engine, packings (12), (13) that are always in contact with step parts (6), (9) of casing (2) and cover (3) secure element (4), and no gaps that can cause sealing leakage can occur. When clogged element (4) is to be replaced, clip (11) set on flange (21) is released, and casing (2) or cover (3) is removed to expose the side wall of element (4) so that replacement can be performed easily by gripping the side wall. } cover

For the air cleaner of this device explained above, an element end plate is not used, while a simple cover is used that fixes the element set in the casing. Consequently, it is possible to reduce the number of members that form the air cleaner and to reduce the weight. Also, replacement of the clogged element can be performed easily by simply holding the side wall portion of the element. In addition, because the honeycomb filter element has the inlets and

outlets of the plural through passages that are parallel to each other and are partitioned by the filtering material enclosed alternately, the filtering area becomes larger, and the service life becomes longer.

Brief description of the figures

Figure 1 is a cross section of the air cleaner of this device. Figure 2 is a spiral element in an application example of this device. Figure 3 is a diagram illustrating the step part and the polyurethane packing.

- | | |
|--------|--------------------------|
| 1 | Air cleaner |
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| 6, 9 | Step part |
| 12, 13 | Packing |

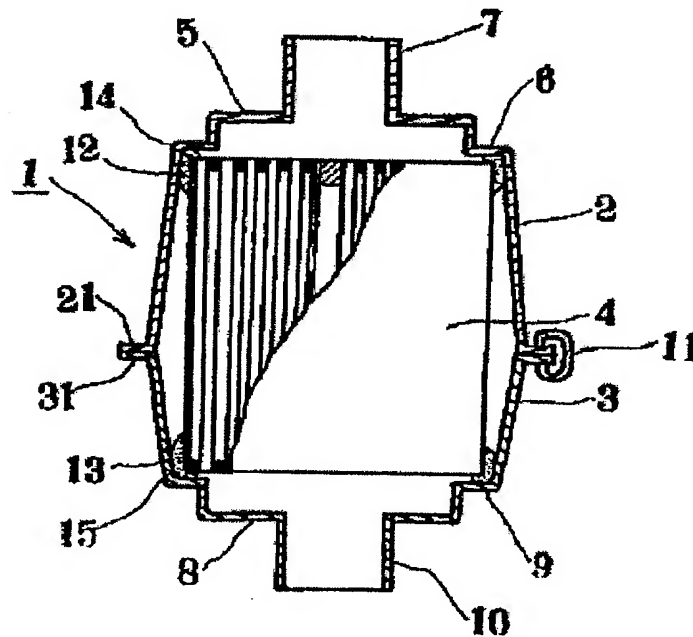


Figure 1

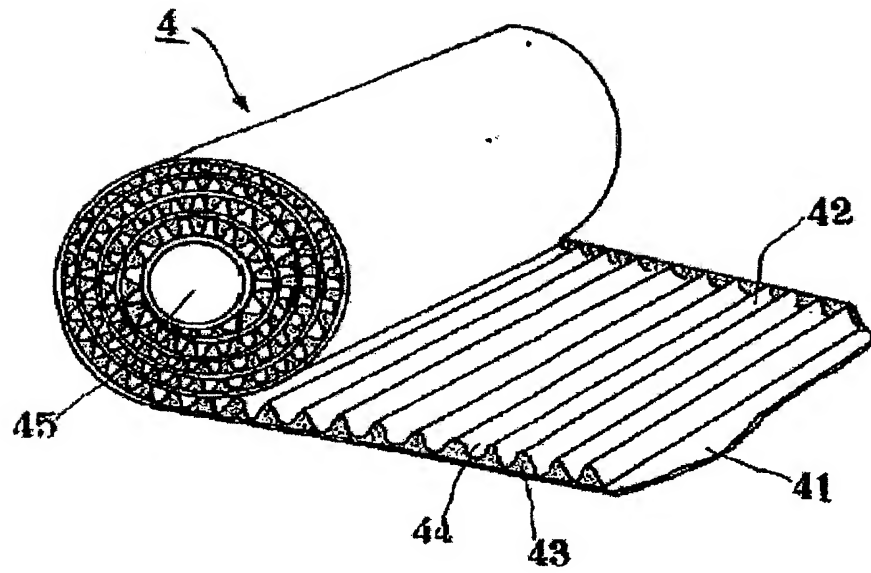


Figure 2

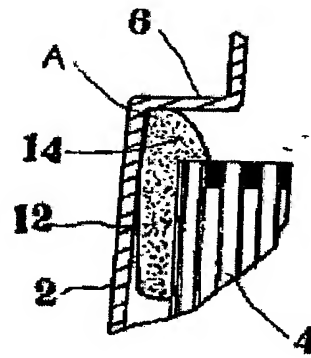


Figure 3